

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF THE CLAIMS:

1-27 (Cancelled)

28. (Original) A method for manufacturing a semiconductor device including a hetero-junction bipolar transistor which comprises a collector layer, a collector electrode, a mesa-shaped base layer, a base electrode, a mesa-shaped emitter layer and an emitter electrode over a semiconductor substrate,

wherein a layer to be the mesa-shaped base layer is formed into a mesa-shape after the base electrode is formed.

29. (Original) A method according to Claim 28, wherein the collector layer, the mesa-shaped base layer and the mesa-shaped emitter layer are comprised of GaAs and the base electrode is comprised of Au.

30. (Original) A method according to Claim 29, wherein a wet etching is performed to form the layer to be the mesa-shaped base layer into the mesa-shape.

31. (Original) A method according to Claim 30, wherein the base electrode is made with use of an etching mask when the wet etching is performed.

32. (Original) A method according to Claim 28, wherein the semiconductor device includes a Schottky diode and a resistance element over the semiconductor substrate.

33. (Original) A method for manufacturing a semiconductor device having a hetero-junction bipolar transistor over a semiconductor substrate, comprising the steps of:

(a) preparing a semiconductor substrate having a first semiconductor layer of a first type over the semiconductor substrate, a second semiconductor layer of a second type over the first semiconductor layer, and a third semiconductor layer of the first type over the second semiconductor layer, wherein the first type and the second type are opposite;

(b) forming an emitter electrode of the hetero-junction bipolar transistor over the third semiconductor layer;

(c) forming the third semiconductor layer into a mesa-shaped emitter layer of the hetero-junction bipolar transistor;

(d) forming a base electrode over the second semiconductor layer outside the mesa-shaped emitter layer; and

(e) after the step (d), forming the second semiconductor layer into a mesa-shaped base layer of the hetero-junction bipolar transistor.

34. (Original) A method according to Claim 33, further comprising the steps of:

(f) forming a collector electrode of the hetero-junction bipolar transistor over the first semiconductor layer outside the mesa-shaped base layer; and

(g) forming the first semiconductor layer into a mesa-shaped collector layer of the hetero-junction bipolar transistor.

35. (Original) A method according to Claim 34, wherein the step (e) comprises the steps of:

(e1) forming a photoresist film over the mesa-shaped emitter layer; and

(e2) performing a wet etching to form the second semiconductor layer into the mesa-shaped base layer.

36. (Original) A method according to Claim 35, wherein in the step (e2), the base electrode and the photoresist film are made with use of an etching mask.

37. (Original) A method according to Claim 35, wherein the first, the second, and the third semiconductor layers are comprised of GaAs and the base electrode is comprised of Au.

38. (Original) A method according to Claim 35, wherein the mesa-shaped collector is comprised of a lower portion and an upper portion, and the collector electrode is electrically connected to the lower portion of the mesa-shaped collector.

39. (Original) A method according to Claim 33, wherein the semiconductor device includes a Schottky diode and a resistance element over the semiconductor substrate.

40. (Original) A method for manufacturing a semiconductor device having a hetero-junction bipolar transistor over a semiconductor substrate, comprising the steps of:

- (a) preparing a semiconductor substrate;
- (b) forming a first semiconductor layer of a first type over the semiconductor substrate;
- (c) forming a second semiconductor layer of a second type, which is opposite of the first type, over the first semiconductor layer;
- (d) forming a third semiconductor layer of the first type over the second semiconductor layer;
- (e) forming an emitter electrode of the hetero-junction bipolar transistor over the third semiconductor layer;
- (f) forming the third semiconductor layer into a mesa-shaped emitter layer of the hetero-junction bipolar transistor;

(g) forming a base electrode over the second semiconductor layer outside the mesa-shaped emitter layer; and

(h) after the step (d), forming the second semiconductor layer into a mesa-shaped base layer of the hetero-junction bipolar transistor.

41. (Original) A method according to Claim 40, further comprising the steps of:

(i) forming a collector electrode of the hetero-junction bipolar transistor over the first semiconductor layer outside the mesa-shaped base layer; and

(j) forming the first semiconductor layer into a mesa-shaped collector layer of the hetero-junction bipolar transistor.